

Application Serial No. 09/407,204
Examiner: N. Parekh
Art Unit: 2811

PATENT
M&G No. 08688.0128US01

Remarks

Reconsideration is respectfully requested in view of the above amendments and following remarks. Claims 3, 5 and 6 are amended to correct claim dependencies. Revisions of claims 1, 19 and 20 are supported, for instance, in Figures 1 and 5. Claims 2 and 7-18 have been previously canceled without prejudice or disclaimer. No new matter has been added. Claims 1, 3-6 and 19-21 are pending.

Claims 3, 5 and 6 are objected to for informalities. Applicant respectfully submits that the dependencies of claims 3, 5 and 6 have been revised to depend upon claim 1, as suggested in the Office Action.

Withdrawal of the objection is respectfully requested.

Claims 1, 3-6 and 19-21 are rejected under 35 U.S.C. 103(a) as being unpatentable over Akram et al. (U.S. Patent No. 6,051,878) in view of Bertin et al. (U.S. Patent o. 5,977,640) and Panchou et al. (U.S. Patent No. 6,040,630). Applicant respectfully traverses this rejection to the extent that it is maintained, and respectfully requests reconsideration in view of the following comments.

Claim 1 recites semiconductor chip module that includes a first conductor unit for connecting electrically said contact pads of the first semiconductor chip and the first circuit traces of the chip-mounting member. The first conductor unit is a plurality of conductive contact balls that are disposed within said holes of a dielectric tape member that adhesively bonds the first semiconductor chip to the chip-mounting member.

Claim 19 recites a semiconductor chip module stack including the same conductive contact ball structure as claim 1. Claim 20 is directed to a semiconductor chip module having two semiconductor chips assembled onto opposite surfaces of a chip-mounting member and including two conductor units, with a similar structure as in claim 1, for electrically connecting the chips to the chip-mounting member.

The present invention provides a semiconductor module with a structure that can be manufactured in a fully automated manner that is convenient, while lowering production costs. Namely, the conductive contact balls can be separately placed within the holes of the dielectric member, and help to prevent the need for forming additional structures on the substrate. Further,

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the present invention maintains good electrical connection between conductive module elements, while providing for the lower manufacturing costs (page 18, lines 20-26).

As noted in the Office Action, Akram et al. does not disclose the features of as required in claims 1, 19 and 20. Particularly, Akram et al. does not teach plated through holes, and does not disclose using a dielectric tape member with holes and a conductor unit structures including a plurality of contact balls that are in the holes of the dielectric tape member.

Bertin et al. is directed to a chip-on-chip module providing various configurations of wiring patterns. However, Bertin et al. does not provide what is missing from Akram et al. Particularly, Bertin et al. does not teach or suggest conductive contact balls disposed within the dielectric tape member. For at least these reasons, Bertin et al. does not remedy the deficiencies of Akram et al. Furthermore, to the extent that Bertin et al. discusses plated through holes for connecting with solder balls, which Applicant does not concede, there is no reasonable suggestion for combining the wiring patterns of the chip-on-chip structure of Bertin et al. with the semiconductor package of Akram et al. without using the benefit and hindsight of Applicant's disclosure.

Panchou et al. is directed to an integrated circuit package for a flip-chip with an alignment perform feature. Panchou et al. discloses a thermoplastic attachment film 30 for establishing a thermoplastic bond between a flip chip 11 and a substrate. Conductive thermoplastic bumps 14 are screenprinted on the flip chip 11 at appropriate contacts 12 (col. 4, lines 33-38). Particularly, the conductive thermoplastic bumps 14 are used to allow formation of a more secure thermoplastic bond between the flip chip 11 and the substrate through the vias 34 of the thermoplastic attachment film (col. 4, lines 46-51 and Figure 4a).

However, Panchou et al. does not provide what is missing from Akram et al. Particularly, Panchou et al. does not teach or suggest conductor units having conductive contact balls disposed within the holes of the dielectric tape member. In fact, Panchou et al. provides for a flip-chip 11 already screenprinted with conductive thermoplastic bumps 14. Further, the conductive thermoplastic bumps 14 are larger in thickness (3 mil) than the thermoplastic attachment film 30 (2 mil) before (col. 5, lines 10-24 and Figure 4a). With the bumps 14 printed on the flip-chip 11, the package of Panchou et al. requires the flip-chip 11 to be positioned, fitted and compressed for providing the thermoplastic bond desired, thereby providing a package

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produced in a more complex manner. Moreover, as the bumps 14 are larger in thickness than the attachment film 30, the bumps can reside outside of the vias 34 of the attachment film 30 after being compressed. Thus, Panchou et al. does not remedy the deficiencies of Akram et al. Panchou et al. does not disclose the conductive contact ball structure as required by claims 1, 19 and 20. Further, Panchou et al. does not realize the automated production advantages provided by the improved module structure of the present invention (page 18, lines 20-26). Even if the disclosure of Panchou et al. could be combined with Akram et al. and Bertin et al., which Applicant does not concede, there is reasonable suggestion in the cited references, either alone or in combination, would derive the features or enjoy the advantages of the claimed invention.

Accordingly, it is respectfully submitted that claims 1, 19 and 20 and respective dependent claims 3-6 and 21 are patentable over the cited references, for at least the above discussed reasons.

Favorable consideration and withdrawal of the rejection are respectfully requested.

With the above amendments and remarks, Applicant believes that the claims pending in this patent application are in a condition for allowance. Favorable consideration is respectfully requested. If any further questions arise, the Examiner is invited to contact Applicant's representative at the number listed below.

Respectfully Submitted,

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